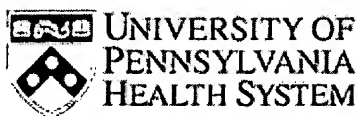


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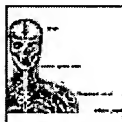
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## Cognitive Neurology, Neuro-Orthopaedics

### Peripheral neuropathy



Nervous system



Central nervous system

#### Definition:

**Peripheral neuropathy** is a failure of the nerves that carry information to and from the brain and spinal cord. This produces pain, loss of sensation, and inability to control muscles. ↴

The term **peripheral neuropathy** can be broken down as follows: "neuro" = nerves, "pathy" = abnormal, and "peripheral" = nerves beyond the brain and spinal cord.

#### Alternative Names:

**Peripheral neuritis; Neuropathy - peripheral; Neuritis - peripheral**

#### Causes, incidence, and risk factors:

The **peripheral** nerves relay information from your central nervous system (brain and spinal cord) to muscles and other organs and from your skin, joints, and other organs back to your brain. **Peripheral neuropathy** occurs when these nerves fail to function properly, resulting in pain, loss of sensation, or inability to control muscles.

In some cases, the failure of nerves that control blood vessels, intestines, and other organs results in abnormal blood pressure, digestion problems, and loss of other basic body processes. **Peripheral neuropathy** may involve damage to a single nerve or nerve group (mononeuropathy) or may affect multiple nerves (polyneuropathy).

There are numerous reasons for nerves to malfunction. In some cases, ~~no cause can be identified~~. Damage to nerves can result from one of the specific conditions associated with **neuropathy**, including:

- Hereditary disorders
  - Charcot-Marie-Tooth disease
  - Friedreich's ataxia
- Systemic or metabolic disorders
  - Diabetes (diabetic neuropathy)
  - Dietary deficiencies (especially vitamin B-12)
  - Excessive alcohol use (alcoholic neuropathy)
  - Uremia (from kidney failure)
  - Cancer
- Infectious or inflammatory conditions
  - AIDS
  - Hepatitis
  - Colorado tick fever
  - diphtheria
  - Guillain-Barre syndrome
  - HIV infection without development of AIDS
  - leprosy
  - Lyme
  - polyarteritis nodosa
  - rheumatoid arthritis
  - sarcoidosis
  - Sjogren syndrome
  - syphilis
  - systemic lupus erythematosus
  - amyloid
- Exposure to toxic compounds
  - sniffing glue or other toxic compounds
  - nitrous oxide
  - industrial agents -- especially solvents
  - heavy metals (lead, arsenic, mercury, etc.)
- Neuropathy secondary to drugs (many drugs can cause neuropathy)
- Miscellaneous causes
  - ischemia (decreased oxygen/decreased blood flow)
  - prolonged exposure to cold temperature

**Peripheral neuropathy** is very common. Because there are numerous types and causes of **neuropathy** and scientists don't always agree on the same definition of **neuropathy**, the exact incidence cannot be determined precisely.

Risk factors for **neuropathy** include diabetes, heavy alcohol use, and exposure to certain chemicals and drugs. Some people have a hereditary predisposition for **neuropathy**.

Prolonged pressure on a nerve is another risk for developing a nerve injury. Pressure injury may be caused by prolonged immobility (such as a long surgical procedure or lengthy illness) or compression of a nerve by casts, splints, braces, crutches, or other devices.

#### Symptoms:

The symptoms depend on which type of nerve is affected. The three main types of nerves are sensory, motor, and autonomic. **Neuropathy** can affect any one or a combination of all three types of nerves. Symptoms also depend on whether the condition affects the whole body or just one nerve (as from an injury).

#### SENSATION CHANGES

Damage to sensory fibers results in changes in sensation, burning sensations, nerve pain, tingling or numbness, or an inability to determine joint position, which causes incoordination.

For many neuropathies, sensation changes often begin in the feet and progress toward the center of the body with involvement of other areas as the condition worsens.

### MOVEMENT DIFFICULTIES

Damage to the motor fibers interferes with muscle control and can cause weakness, loss of muscle bulk, and loss of dexterity. Sometimes, cramps are a sign of motor nerve involvement.

Other muscle-related symptoms include:

- lack of muscle control
- difficulty or inability to move a part of the body (paralysis)
- muscle atrophy
- muscle twitching (fasciculation) or cramping
- difficulty breathing or swallowing
- falling (from legs buckling or tripping over toes)
- lack of dexterity (such as being unable to button a shirt)

### AUTONOMIC SYMPTOMS

The autonomic nerves control involuntary or semi-voluntary functions, such as control of internal organs and blood pressure. Damage to autonomic nerves can cause:

- blurred vision
- decreased ability to sweat
- dizziness that occurs when standing up or fainting associated with a fall in blood pressure
- heat intolerance with exertion (decreased ability to regulate body temperature)
- nausea or vomiting after meals
- abdominal bloating (swelling)
- feeling full after eating a small amount (early satiety)
- diarrhea
- constipation
- unintentional weight loss (more than 5% of body weight)
- urinary incontinence
- feeling of incomplete bladder emptying
- difficulty beginning to urinate (urinary hesitancy)
- male impotence

### Signs and tests:

A detailed history will be needed to determine the cause of the **neuropathy**. Neurologic examination may reveal abnormalities of movement, sensation, or organ function. (See also entries on the specific nerve dysfunction.) Changes in reflexes and muscle bulk may also be present.

Tests that reveal **neuropathy** may include:

- EMG (a recording of electrical activity in muscles)
- Nerve conduction tests
- Nerve biopsy
- Blood tests to screen for medical conditions, such as diabetes and vitamin deficiency, among others.

Tests for **neuropathy** are guided by the suspected cause of the disorder, as suggested by the history, symptoms, and pattern of symptom development. They may include various blood tests, x-rays, scans, or other tests and procedures.

### Treatment:

The goal of treatment may be to identify and treat the underlying cause, cure the disorder if possible, give the patient maximum independence and self-care ability, and control the symptoms. As a rule, the first steps are to treat the underlying medical problem (such as diabetes) or remove the cause (such as alcohol).

Physical therapy, occupational therapy, and orthopedic interventions may be recommended to promote self care ability and independence. For example, exercises and retraining may be used to increase muscle strength and control. Appliances such as wheelchairs, braces, and splints may improve mobility or ability to use an affected

arm or leg.

Safety is an important consideration for people with **neuropathy**. Lack of muscle control and reduced sensation increase the risk of falls and other injuries. The person may not notice a potential source of injury because he or she can't feel it. For this reason, people with decreased sensation should check their feet or other affected areas frequently for bruises, open skin areas, or other injuries, which may go unnoticed (because there is **no** pain) and become severely infected. Often, a podiatrist can determine if special orthotic devices are needed.

Safety measures for people experiencing difficulty with movement may include railings, various appliances, removing obstacles such as loose rugs, and other measures as appropriate. Safety measures for people having difficulty with sensation include adequate lighting (including lights left on at night), testing water temperature before bathing, use of protective shoes (**no** open toes, **no** high heels, and so on) and similar measures. Shoes should be checked often for grit or rough spots that may cause injury to the feet.

People with **neuropathy** (especially those with polyneuropathy or **mononeuropathy multiplex**) are prone to new nerve injury at pressure points (knees and elbows, for example). They should avoid prolonged pressure on these areas from leaning on the elbows, crossing the knees, or assuming similar positions.

Over-the-counter or prescription pain medications may be needed to control nerve pain. Anticonvulsants (phenytoin, carbamazepine, gabapentin), tricyclic antidepressants, or other medications may be used to reduce the stabbing pains that some people experience. Whenever possible, medication use should be minimized to avoid side effects.

Adjusting position, using frames to keep bedclothes off tender body parts, or other measures may also be helpful to reduce pain.

Autonomic changes may be treated symptomatically. They may be difficult to treat or respond poorly to treatment.

- Postural hypotension (low blood pressure) -- use of elastic stockings and sleeping with the head elevated may help. Fludrocortisone or similar medications may be beneficial in reducing postural hypotension for some people.
- Reduced gastric motility -- medications that increase gastric motility (such as metoclopramide), eating small frequent meals, sleeping with the head elevated, or other measures may help.
- Bladder dysfunction -- manual expression of urine (pressing over the bladder with the hands), intermittent catheterization, or medications such as bethanechol may be necessary.
- Impotence, diarrhea, constipation or other symptoms are treated as appropriate.

#### Support Groups:

Additional information can be obtained from the Neuropathy Association.

#### Expectations (prognosis):

The outcome greatly depends on the cause of the **neuropathy**. In cases where a medical condition can be identified and treated, the outlook may be excellent. However, in severe **neuropathy**, nerve damage can be permanent, even if the cause is treated appropriately.

For most hereditary neuropathies, there is **no cure**. Some of these conditions are harmless, while others progress more rapidly and may lead to permanent, severe complications.

#### Complications:

The inability to feel or notice injuries can lead to infection or structural damage. Changes include poor healing, loss of tissue mass, tissue erosions, scarring, and deformity. Other complications include:

- partial or complete loss of movement (or control of movement)
- partial or complete loss of sensation
- difficulty breathing
- difficulty swallowing
- cardiac arrhythmias (uncommon)
- decreased self esteem
- relationship problems related to impotence
- recurrent or unnoticed injury to any part of the body

#### Calling your health care provider:

Call your health care provider if symptoms of **peripheral neuropathy** are present. In all cases, early diagnosis

and treatment increases the possibility that symptoms can be controlled.

Nerve pain, such as that caused by **peripheral neuropathy**, can be difficult to control; if pain is severe, see a pain specialist to ensure that you get the best and most up-to-date pain treatment.

Emergency symptoms include irregular or rapid heartbeats, difficulty breathing, difficulty swallowing and fainting.

#### **Prevention:**

If a prolonged procedure or immobility is expected, appropriate measures (such as padding vulnerable areas) can be taken beforehand to reduce the risk of nerve problems.

Some people have a hereditary predisposition for **neuropathy**. Such people need to be especially careful to limit alcohol and manage other medical problems closely.

All people can reduce the risk of **neuropathy** through a balanced diet, drinking alcohol in moderation, and maintaining good control of diabetes and other medical problems, if present.

#### **References:**

Delalande S, de Seze J, Fauchais AL, et al. Neurologic manifestations in primary Sjogren syndrome: a study of 82 patients. *Medicine* (Baltimore). 2004 Sep;83(5):280-91.

Mori K, Iijima M, Sugiura M. Sjogren's syndrome associated painful sensory **neuropathy** without sensory ataxia. *J Neurol Neurosurg Psychiatry*. 2003 Sep;74(9):1320-2.

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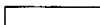
#### **Review** Date: 7/2/2004

Reviewed By: Joseph V. Campellone, M.D., Division of Neurology, Cooper University Hospital, Camden, NJ. **Review** provided by VeriMed Healthcare Network.



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## Peripheral neuropathy



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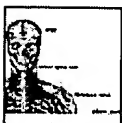


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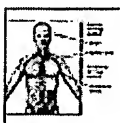
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**Peripheral neuritis; Neuropathy - peripheral; Neuritis - peripheral****Definition** [Return to top](#)

**Peripheral neuropathy** is a problem with the nerves that carry information to and from the brain and spinal cord. This produces pain, loss of sensation, and inability to control muscles.

- "Peripheral" means nerves beyond the brain and spinal cord.
- "Neuro" means nerves.
- "Pathy" means abnormal.

**Causes, incidence, and risk factors** [Return to top](#)

The **peripheral** nerves relay information from your central nervous system (brain and spinal cord) to muscles and other organs and from your skin, joints, and other organs back to your brain. **Peripheral neuropathy** occurs when these nerves fail to function properly, resulting in pain, loss of sensation, or inability to control muscles.

In some cases, the failure of nerves that control blood vessels, intestines, and other organs results in abnormal blood pressure, digestion problems, and loss of other basic body processes. **Peripheral neuropathy** may involve damage to a single nerve or nerve group (mononeuropathy) or may affect multiple nerves (polyneuropathy).

There are numerous reasons for nerves to malfunction. In some cases, **no** cause can be identified. Damage to nerves can result from one of the specific conditions associated with **neuropathy**, including:

- Hereditary disorders
  - Charcot-Marie-Tooth disease
  - Friedreich's ataxia
- Systemic or metabolic disorders
  - Diabetes (**diabetic neuropathy**)
  - Dietary deficiencies (especially vitamin B-12)
  - Excessive alcohol use (alcoholic neuropathy)
  - Uremia (from kidney failure)
  - Cancer
- Infectious or inflammatory conditions
  - AIDS
  - Hepatitis
  - Colorado tick fever
  - Diphtheria
  - Guillain-Barre syndrome
  - HIV infection without development of AIDS
  - Leprosy
  - Lyme disease
  - Polyarteritis nodosa
  - Rheumatoid arthritis
  - Sarcoidosis
  - Sjogren syndrome
  - Syphilis
  - Systemic lupus erythematosus
  - Amyloidosis
- Exposure to toxic compounds
  - Sniffing glue or other toxic compounds
  - Nitrous oxide

- o Industrial agents -- especially solvents
- o Heavy metals (lead, arsenic, mercury, etc.)
- **Neuropathy secondary to drugs** (many drugs can cause **neuropathy**)
- Miscellaneous causes
  - o Ischemia (decreased oxygen and blood flow)
  - o Prolonged exposure to cold temperature

**Peripheral neuropathy** is very common. Because there are numerous types and causes of **neuropathy** and scientists don't always agree on the same definition of **neuropathy**, the exact incidence cannot be determined precisely.

Some people have a hereditary predisposition for **neuropathy**.

Prolonged pressure on a nerve is another risk for developing a nerve injury. Pressure injury may be caused by prolonged immobility (such as a long surgical procedure or lengthy illness) or compression of a nerve by casts, splints, braces, crutches, or other devices.

## Symptoms [Return to top](#)

The symptoms depend on which type of nerve is affected. The three main types of nerves are sensory, motor, and autonomic. **Neuropathy** can affect any one or a combination of all three types of nerves. Symptoms also depend on whether the condition affects the whole body or just one nerve (as from an injury).

## SENSATION CHANGES

Damage to sensory fibers results in changes in sensation, burning sensations, nerve pain, tingling or numbness, or an inability to determine joint position, which causes incoordination.

For many neuropathies, sensation changes often begin in the feet and progress toward the center of the body with involvement of other areas as the condition worsens.

## MOVEMENT DIFFICULTIES

Damage to the motor fibers interferes with muscle control and can cause weakness, loss of muscle bulk, and loss of dexterity. Sometimes, cramps are a sign of motor nerve involvement.

Other muscle-related symptoms include:

- Lack of muscle control
- Difficulty or inability to move a part of the body (paralysis)
- Muscle atrophy
- Muscle twitching (fasciculation) or cramping
- Difficulty breathing or swallowing
- Falling (from legs buckling or tripping over toes)
- Lack of dexterity (such as being unable to button a shirt)

## AUTONOMIC SYMPTOMS

The autonomic nerves control involuntary or semi-voluntary functions, such as control of internal organs and blood pressure. Damage to autonomic nerves can cause:

- Blurred vision
- Decreased ability to sweat
- Dizziness that occurs when standing up or fainting associated with a fall in blood pressure



- Heat intolerance with exertion (decreased ability to regulate body temperature)
- Nausea or vomiting after meals
- Abdominal bloating (swelling)
- Feeling full after eating a small amount (early satiety)
- Diarrhea
- Constipation
- Unintentional weight loss (more than 5% of body weight)
- Urinary incontinence
- Feeling of incomplete bladder emptying
- Difficulty beginning to urinate (urinary hesitancy)
- Male impotence

### Signs and tests [Return to top](#)

A detailed history will be needed to determine the cause of the **neuropathy**. Neurologic examination may reveal abnormalities of movement, sensation, or organ function. (See also entries on the specific nerve dysfunction.) Changes in reflexes and muscle bulk may also be present.

Tests that reveal **neuropathy** may include:

- EMG (a recording of electrical activity in muscles)
- Nerve conduction tests
- Nerve biopsy
- Blood tests to screen for medical conditions, such as diabetes and vitamin deficiency, among others.

Tests for **neuropathy** are guided by the suspected cause of the disorder, as suggested by the history, symptoms, and pattern of symptom development. They may include various blood tests, x-rays, scans, or other tests and procedures.

### Treatment [Return to top](#)

The first steps of treatment are to identify and treat the underlying medical problem (such as diabetes) or remove the cause (such as alcohol). Other goals include controlling symptoms, curing the disorder if possible, and helping the patient gain maximum independence and self-care ability.

Physical therapy, occupational therapy, and orthopedic interventions may be recommended. For example, exercises and retraining may be used to increase muscle strength and control. Wheelchairs, braces, and splints may improve mobility or the ability to use an affected arm or leg.

Safety is an important consideration for people with **neuropathy**. Lack of muscle control and reduced sensation increase the risk of falls and other injuries. The person may not notice a potential source of injury because he or she can't feel it. For this reason, people with decreased sensation should check their feet or other affected areas frequently for bruises, open skin areas, or other injuries, which may go unnoticed (because there is **no** pain) and become severely infected. Often, a podiatrist can determine if special orthotic devices are needed.

Safety measures for people experiencing difficulty with movement may include railings, various appliances, removing obstacles such as loose rugs, and other measures as appropriate. Safety measures for people having difficulty with sensation include adequate lighting (including lights left on at night), testing water temperature before bathing, use of protective shoes (**no** open toes, **no** high heels, and so on) and similar measures. Shoes should be checked often for grit or rough spots that may cause injury to the feet.

People with **neuropathy** (especially those with polyneuropathy or mononeuropathy multiplex) are prone to new nerve injury at pressure points (knees and elbows, for example). They should avoid prolonged pressure on these areas from leaning on the elbows, crossing the knees, or assuming similar positions.

Over-the-counter or prescription pain medications may be needed to control nerve pain. Anticonvulsants (phenytoin, carbamazepine, gabapentin, and pregabalin), tricyclic antidepressants (duloxetine), or other medications may be used to reduce the stabbing pains that some people experience. Use the lowest dose possible to avoid side effects.

Adjusting position, using frames to keep bedclothes off tender body parts, or other measures may also be helpful to reduce pain.

The symptoms of autonomic changes will be treated. However, they may be difficult to treat or respond poorly to treatment.

- Postural hypotension (low blood pressure) -- use of elastic stockings and sleeping with the head elevated may help. Fludrocortisone or similar medications may be beneficial in reducing postural hypotension for some people.
- Reduced gastric motility -- medications that increase gastric motility (such as metoclopramide), eating small frequent meals, sleeping with the head elevated, or other measures may help.
- Bladder dysfunction -- manual expression of urine (pressing over the bladder with the hands), intermittent catheterization, or medications such as bethanechol may be necessary.
- Impotence, diarrhea, constipation or other symptoms are treated as appropriate.

#### Support Groups [Return to top](#)

Additional information can be obtained from the **Neuropathy Association**.

#### Expectations (prognosis) [Return to top](#)

The outcome greatly depends on the cause of the **neuropathy**. In cases where a medical condition can be identified and treated, the outlook may be excellent. However, in severe **neuropathy**, nerve damage can be permanent, even if the cause is treated appropriately.

For most hereditary neuropathies, there is **no cure**. Some of these conditions are harmless, while others progress more rapidly and may lead to permanent, severe complications.

#### Complications [Return to top](#)

The inability to feel or notice injuries can lead to infection or structural damage. Changes include poor healing, loss of tissue mass, tissue erosions, scarring, and deformity. Other complications include:

- Partial or complete loss of movement (or control of movement)
- Partial or complete loss of sensation
- Difficulty breathing
- Difficulty swallowing
- Cardiac arrhythmias (uncommon)
- Decreased self esteem
- Relationship problems related to impotence
- Recurrent or unnoticed injury to any part of the body

#### Calling your health care provider [Return to top](#)

Call your health care provider if symptoms of **peripheral neuropathy** are present. In all cases, early diagnosis and treatment increases the possibility that symptoms can be controlled.

Nerve pain, such as that caused by **peripheral neuropathy**, can be difficult to control. If pain is severe, contact a pain specialist to make sure you get the best and most up-to-date pain treatment.

Emergency symptoms include irregular or rapid heartbeats, difficulty breathing, difficulty swallowing, and fainting.

#### Prevention [Return to top](#)

If a prolonged procedure or immobility is expected, appropriate measures (such as padding vulnerable areas) can be taken beforehand to reduce the risk of nerve problems.

Some people have a hereditary predisposition for **neuropathy**. Such people need to be especially careful to limit alcohol and manage other medical problems closely.

All people can reduce the risk of **neuropathy** through a balanced diet, drinking alcohol in moderation, and maintaining good control of diabetes and other medical problems, if present.

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Updated by: Daniel Kantor, M.D., Director of the Comprehensive MS Center, Neuroscience Institute, University of Florida Health Science Center, Jacksonville, FL. Review provided by VeriMed Healthcare Network.



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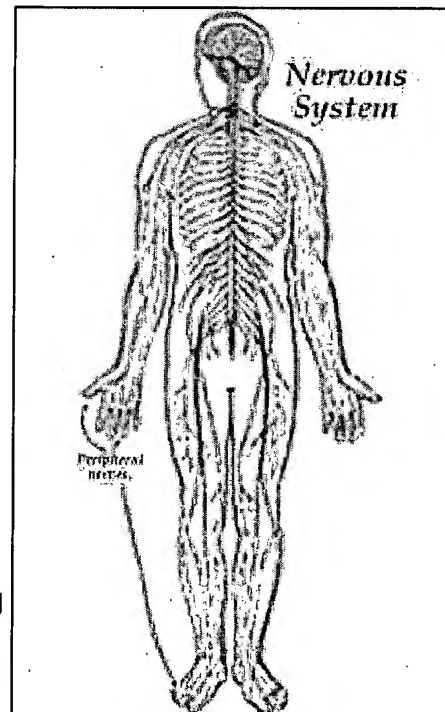
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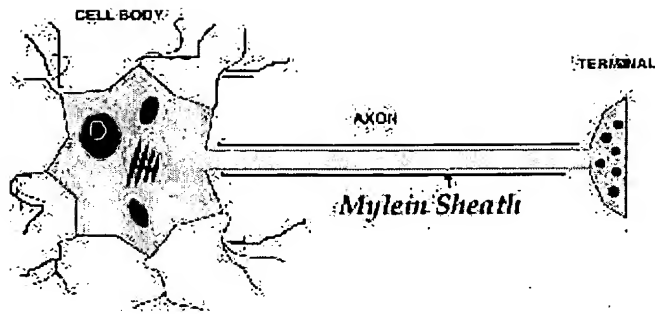
## Neuropathy Nerve Damage | Neuropathy Numbness

The word **neuropathy** is derived from two parts: "neuro" referring to the nerve and "pathy" indicating disease. **Peripheral neuropathy** is a condition involving the nerves outside the central nervous system., mainly in the arms and legs. The majority of the **peripheral** nerves are responsible for sensations you feel such as touch, pain and temperature. There are literally millions of these nerve endings in your fingers, hands, toes and feet which are designed to keep you out of danger and away from the things that are hot, cold, sharp, etc.

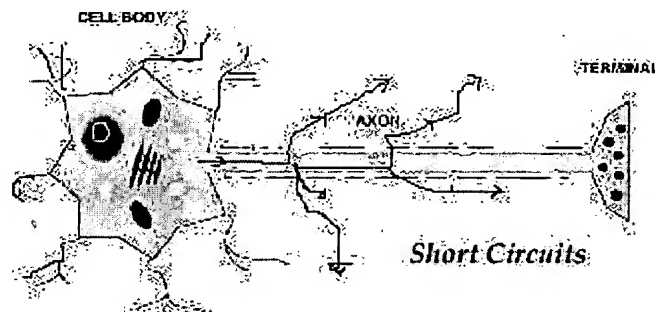
These nerves in your hands and feet also help you control the numerous small muscles and intricate movements in these regions of the body. It would be difficult to walk without knowing what your feet are standing on or to pick things up if you had no idea how hard you were gripping something.

**Peripheral** nerve cells have three main parts: cell body, axons, and dendrites (or terminal).. (See diagram below)





Nerve damage or **neuropathy** normally occurs when the outer sheathing or the myelin (protective covering) of nerve cells degenerate. This is similar to an electrical wire that is covered with insulation, and the insulation is beginning to crumble. Without insulation the unprotected wire will start short-circuiting.



This short-circuiting will cause all the unpleasant sensations that people who are suffering from **neuropathy** pain go through.

**Peripheral neuropathy** can be acquired. Most commonly, it is diabetics that suffer from **neuropathy** pain and it is a major complication of the disease. It is the *higher* than normal sugar levels that creates the **neuropathy**.

The sad fact is that **neuropathy** pain is one of the leading causes of amputations today. After a while this misfiring of the nerves can get so bad that people are unable to walk or pick things up and can get to a point where they would rather have a limb amputated than continue with the pain.

### ***How does this happen?***

**Neuropathy** normally starts when your nerves are deprived of oxygen (anoxia). There are many reasons why this might happen such as too much sugar or insulin in your blood (diabetes), the use of medications, nutritional deficiencies, exposure to toxic substances (ingested in food or water or pollution), radiation therapy for cancer, staying in one position too long (nerve compression, entrapment or laceration), physical injuries (trauma) to the nerve, prolonged compression as in the wearing of inappropriate footwear, and even infections can all block oxygen getting to your nerve cells. Too many free radicals in your bloodstream can also attach themselves to the oxygen and make it unavailable to the cells. Sometimes inflammation in the lower back or sciatic nerve area of the buttocks can restrict blood flow, depriving oxygen to the nerves. Also, common

drugs like statins (to reduce cholesterol) can eat away the myelin sheath which is the insulating envelope composed mostly of cholesterol that surrounds the core of a nerve fiber. High blood pressure medication can cause **neuropathy** by decreasing blood flow at the extremities, like the feet or hands.

### ***Definition of Neuropathy Symptoms:***

More than 100 types of **peripheral neuropathy** pain have been identified, each with its own characteristic set of symptoms, pattern of development. Impaired function and symptoms depend on the type of nerves -- motor, sensory, or autonomic -- that are damaged. Some people may experience temporary numbness, tingling, and pricking sensations, sensitivity to touch, or muscle weakness. Others may suffer more extreme symptoms, including burning pain (especially at night), muscle wasting, paralysis, or organ or gland dysfunction.

The symptoms of **diabetic neuropathy nerve damage** are often slight at first. In fact, some mild cases may go unnoticed for a long time. Numbness, pain, or tingling in the feet, or legs may, after several years, lead to weakness in the muscles of the feet. Occasionally, diabetic **neuropathy** can flare up suddenly and affect specific nerves so that an affected individual will develop double vision or drooping eyelids, or weakness and atrophy of the thigh muscles. Nerve damage caused by diabetes generally occurs over a period of years and may lead to problems with the digestive tract and sexual organs, which can cause indigestion, diarrhea or constipation, dizziness, bladder infections, and impotence. The loss of sensation in the feet may increase the possibility for foot injuries to go unnoticed and develop into ulcers or lesions that become infected.

**Peripheral neuropathy** affects at least 20 million people in the United States.

*Some Conditions associated with **peripheral** nerve damage include the following:*

- Alcoholism
- Amyloidosis (metabolic **disorder**)
- Autoimmune disorders
- Bell's Palsy
- Cancer
- Charco Marie-Tooth disease
- Carpal tunnel syndrome
- Chronic kidney failure
- Connective tissue disease (e.g., rheumatoid arthritis, lupus, sarcoidosis)
- Diabetes mellitus
- Infectious disease (e.g., Lyme disease, HIV/AIDS, hepatitis B, leprosy)
- Liver failure
- Medications
- Radiculopathy
- Vitamin deficiencies (e.g., pernicious anemia)

### ***Neuropathy Pain Treatment:***

Today, most people with **neuropathy** are only treating the symptoms and not getting to the root of the problem. Furthermore, many medications given to people with **neuropathy** or diabetes actually makes the problem worse instead of correcting the cause of the problem.

Currently the most common treatment is drug related, but the side effects of drugs are often many times worse than the disease. Other electronic devices (infrared) that merely heat the feet have been tried unsuccessfully.

The only way to correctly manage **neuropathy** is to address the real causes, not the symptoms.

It has been known for some time that increased levels of Thiamine (vitamin B1) in the blood stream are very effective in reducing and reversing **neuropathy**. Unfortunately, the oral intake of vitamin B1 does not greatly increase the levels of B1 in the blood stream. Previously, intravenous feeding or injections directly into blood stream every few weeks were needed to increase levels of B1.

The reason methods like this had to be used is that Thiamine (sometimes spelled Tiamine), like all of the B vitamins, is water-soluble. Thiamine cannot be stored in the body and flushes out within 4 to 5 hours. Oral intake of Thiamine over 5 mg results in greatly reduced bioavailability and immediate flushing from the body (this is why urine frequently turns yellow when taking larger doses of B vitamins).

**Neuropathy** has also been found to be caused and made worse by deficiencies of vitamin B12 in the body. Vitamin B12 supports the sheathing that protects nerve cells and has shown in studies that it promotes the regeneration and growth of nerve cells.

In the past it has been difficult to remedy this deficiency. The reason for this is that while vitamin B12 is readily stored by the body, it is not readily absorbed by the body. For this reason much larger amounts have been used in supplementation, but even large oral dosages have not been an adequate solution.

The most common type of vitamin B12 used in supplements is called Cyanocobalamine. Taking Cyanocobalamine can result in absorption of as little as 1/2 of 1% of the amount taken, which makes it almost impossible to get enough of this vitally important vitamin.

In addition to the very low absorption, the body must convert the Cyanocobalamine (which cannot be used by the body) to a form of vitamin B12 the body can use called Methylcobalamine. Unfortunately, as the body gets older it loses this ability to convert Cobalamine to Methylcobalamine.

For the above reasons, as people get older, many physicians recommend regular

monthly injections of vitamin B12 to maintain adequate body levels or to replenish greatly depleted stores of this vital nutrient.

#### **A Remedy for this Problem:**

You might have heard of the new type of vitamin B1 being produced, called Benfotiamine. It is a fat-soluble version of vitamin B1. What does this mean? It means this new form of vitamin B1 can be taken orally in large dosages and it will not flush out of the body the way ordinary Thiamine (vitamin B1) does.

The result is that by taking Benfotiamine the blood stream levels of vitamin B1 can now be greatly increased, nutritionally supporting the body to rapidly and effectively decrease or eliminate the symptoms of **Neuropathy**.

Also available is Methylcobalamine (called Methyl B12). This is the form of vitamin B12 that can be directly utilized by the body and is available in the quantities nutritionally needed by the body to repair itself. Methyl B12 can be taken orally and is immediately available to the body much like injectable vitamin B12.

These vitamins are now Available together.

The WSN® *"Nerve Support Formula"* now contains both Benfotiamine and Methyl B12. The result is that the blood stream levels of vitamin B1 and vitamin B12 can be greatly increased, providing the nutritional support needed by the body to rapidly and far more effectively to decrease or eliminate the symptoms of diabetic **peripheral neuropathy**.

Many customers previously using just the Benfotiamine reported a lessening of their **within 4 to 7 days**. The new *"Nerve Support Formula"* is far more effective than either the Benfotiamine or Methyl B12 alone.

**Both Benfotiamine and Methyl B12 have been shown to be non-toxic and without any side effects even in very high dosages.**

**These vitamins have a 90 Day money back guarantee AND the *Wellness Support Network* has a *live support line*. You can call them with any questions you have. They also will guide you through whatever you need to do to get relief.**

**They have lots of great success stories, so check them out on the pages below (click the banner)**

**If you are experiencing:**

- \* Tingling or numbness in the fingers, toes or legs.**
- \* Feeling cold, burning or pain in the hands, feet or legs.**
- \* Extreme sensitivity to touch, even a light touch.**



- \* Sharp pains or cramps.
- \* Loss of balance and coordination.

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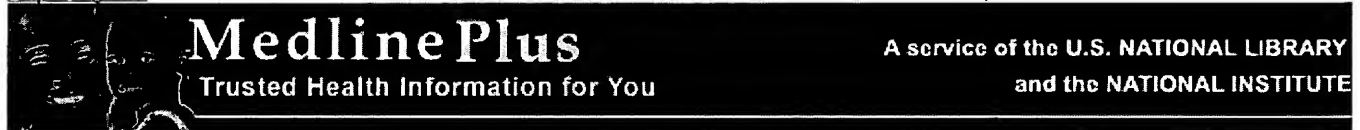
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## Peripheral neuropathy



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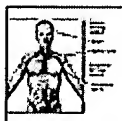
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**Peripheral neuritis; Neuropathy - peripheral; Neuritis - peripheral****Definition** [Return to top](#)

**Peripheral neuropathy** is a problem with the nerves that carry information to and from the brain and spinal cord. This produces pain, loss of sensation, and inability to control muscles.

- "Peripheral" means nerves beyond the brain and spinal cord.
- "Neuro" means nerves.
- "Pathy" means abnormal.

**Causes, incidence, and risk factors** [Return to top](#)

The **peripheral** nerves relay information from your central nervous system (brain and spinal cord) to muscles and other organs and from your skin, joints, and other organs back to your brain. **Peripheral neuropathy** occurs when these nerves fail to function properly, resulting in pain, loss of sensation, or inability to control muscles.

In some cases, the failure of nerves that control blood vessels, intestines, and other organs results in abnormal blood pressure, digestion problems, and loss of other basic body processes. **Peripheral neuropathy** may involve damage to a single nerve or nerve group (mononeuropathy) or may affect multiple nerves (polyneuropathy).

There are numerous reasons for nerves to malfunction. In some cases, no cause can be identified. Damage to nerves can result from one of the specific conditions associated with **neuropathy**, including:

- Hereditary disorders
  - Charcot-Marie-Tooth disease
  - Friedreich's ataxia
- Systemic or metabolic disorders
  - Diabetes (diabetic **neuropathy**)
  - Dietary deficiencies (especially vitamin B-12)
  - Excessive alcohol use (alcoholic **neuropathy**)
  - Uremia (from kidney failure)
  - Cancer
- Infectious or inflammatory conditions
  - AIDS
  - Hepatitis
  - Colorado tick fever
  - Diphtheria
  - Guillain-Barre syndrome
  - HIV infection without development of AIDS
  - Leprosy
  - Lyme disease
  - Polyarteritis nodosa
  - Rheumatoid arthritis
  - Sarcoidosis
  - Sjogren syndrome
  - Syphilis
  - Systemic lupus erythematosus
  - Amyloidosis
- Exposure to toxic compounds
  - Sniffing glue or other toxic compounds
  - Nitrous oxide

- Industrial agents -- especially solvents
- Heavy metals (lead, arsenic, mercury, etc.)
- **Neuropathy secondary to drugs** (many drugs can cause **neuropathy**)
- Miscellaneous causes
  - Ischemia (decreased oxygen and blood flow)
  - Prolonged exposure to cold temperature

**Peripheral neuropathy** is very common. Because there are numerous types and causes of **neuropathy** and scientists don't always agree on the same **definition of neuropathy**, the exact incidence cannot be determined precisely.

Some people have a hereditary predisposition for **neuropathy**.

Prolonged pressure on a nerve is another risk for developing a nerve injury. Pressure injury may be caused by prolonged immobility (such as a long surgical procedure or lengthy illness) or compression of a nerve by casts, splints, braces, crutches, or other devices.

## Symptoms [Return to top](#)

The symptoms depend on which type of nerve is affected. The three main types of nerves are sensory, motor, and autonomic. **Neuropathy** can affect any one or a combination of all three types of nerves. Symptoms also depend on whether the condition affects the whole body or just one nerve (as from an injury).

## SENSATION CHANGES

Damage to sensory fibers results in changes in sensation, burning sensations, nerve pain; tingling or numbness, or an inability to determine joint position, which causes incoordination.

For many neuropathies, sensation changes often begin in the feet and progress toward the center of the body with involvement of other areas as the condition worsens.

## MOVEMENT DIFFICULTIES

Damage to the motor fibers interferes with muscle control and can cause weakness, loss of muscle bulk, and loss of dexterity. Sometimes, cramps are a sign of motor nerve involvement.

Other muscle-related symptoms include:

- Lack of muscle control
- Difficulty or inability to move a part of the body (paralysis)
- Muscle atrophy
- Muscle twitching (fasciculation) or cramping
- Difficulty breathing or swallowing
- Falling (from legs buckling or tripping over toes)
- Lack of dexterity (such as being unable to button a shirt)

## AUTONOMIC SYMPTOMS

The autonomic nerves control involuntary or semi-voluntary functions, such as control of internal organs and blood pressure. Damage to autonomic nerves can cause:

- Blurred vision
- Decreased ability to sweat
- Dizziness that occurs when standing up or fainting associated with a fall in blood pressure

- Heat intolerance with exertion (decreased ability to regulate body temperature)
- Nausea or vomiting after meals
- Abdominal bloating (swelling)
- Feeling full after eating a small amount (early satiety)
- Diarrhea
- Constipation
- Unintentional weight loss (more than 5% of body weight)
- Urinary incontinence
- Feeling of incomplete bladder emptying
- Difficulty beginning to urinate (urinary hesitancy)
- Male impotence

#### Signs and tests [Return to top](#)

A detailed history will be needed to determine the cause of the **neuropathy**. Neurologic examination may reveal abnormalities of movement, sensation, or organ function. (See also entries on the specific nerve dysfunction.) Changes in reflexes and muscle bulk may also be present.

Tests that reveal **neuropathy** may include:

- EMG (a recording of electrical activity in muscles)
- Nerve conduction tests
- Nerve biopsy
- Blood tests to screen for medical conditions, such as diabetes and vitamin deficiency, among others.

Tests for **neuropathy** are guided by the suspected cause of the disorder, as suggested by the history, symptoms, and pattern of symptom development. They may include various blood tests, x-rays, scans, or other tests and procedures.

#### Treatment [Return to top](#)

The first steps of treatment are to identify and treat the underlying medical problem (such as diabetes) or remove the cause (such as alcohol). Other goals include controlling symptoms, curing the disorder if possible, and helping the patient gain maximum independence and self-care ability.

Physical therapy, occupational therapy, and orthopedic interventions may be recommended. For example, exercises and retraining may be used to increase muscle strength and control. Wheelchairs, braces, and splints may improve mobility or the ability to use an affected arm or leg.

Safety is an important consideration for people with **neuropathy**. Lack of muscle control and reduced sensation increase the risk of falls and other injuries. The person may not notice a potential source of injury because he or she can't feel it. For this reason, people with decreased sensation should check their feet or other affected areas frequently for bruises, open skin areas, or other injuries, which may go unnoticed (because there is no pain) and become severely infected. Often, a podiatrist can determine if special orthotic devices are needed.

Safety measures for people experiencing difficulty with movement may include railings, various appliances, removing obstacles such as loose rugs, and other measures as appropriate. Safety measures for people having difficulty with sensation include adequate lighting (including lights left on at night), testing water temperature before bathing, use of protective shoes (no open toes, no high heels, and so on) and similar measures. Shoes should be checked often for grit or rough spots that may cause injury to the feet.

People with **neuropathy** (especially those with polyneuropathy or mononeuropathy multiplex) are prone to new nerve injury at pressure points (knees and elbows, for example). They should avoid prolonged pressure on these areas from leaning on the elbows, crossing the knees, or assuming similar positions.

Over-the-counter or prescription pain medications may be needed to control nerve pain. Anticonvulsants (phenytoin, carbamazepine, gabapentin, and pregabalin), tricyclic antidepressants (duloxetine), or other medications may be used to reduce the stabbing pains that some people experience. Use the lowest dose possible to avoid side effects.

Adjusting position, using frames to keep bedclothes off tender body parts, or other measures may also be helpful to reduce pain.

The symptoms of autonomic changes will be treated. However, they may be difficult to treat or respond poorly to treatment.

- Postural hypotension (low blood pressure) -- use of elastic stockings and sleeping with the head elevated may help. Fludrocortisone or similar medications may be beneficial in reducing postural hypotension for some people.
- Reduced gastric motility -- medications that increase gastric motility (such as metoclopramide), eating small frequent meals, sleeping with the head elevated, or other measures may help.
- Bladder dysfunction -- manual expression of urine (pressing over the bladder with the hands), intermittent catheterization, or medications such as bethanechol may be necessary.
- Impotence, diarrhea, constipation or other symptoms are treated as appropriate.

#### Support Groups [Return to top](#)

Additional information can be obtained from the **Neuropathy Association**.

#### Expectations (prognosis) [Return to top](#)

The outcome greatly depends on the cause of the **neuropathy**. In cases where a medical condition can be identified and treated, the outlook may be excellent. However, in severe **neuropathy**, nerve damage can be permanent, even if the cause is treated appropriately.

For most hereditary neuropathies, there is no cure. Some of these conditions are harmless, while others progress more rapidly and may lead to permanent, severe complications.

#### Complications [Return to top](#)

The inability to feel or notice injuries can lead to infection or structural damage. Changes include poor healing, loss of tissue mass, tissue erosions, scarring, and deformity. Other complications include:

- Partial or complete loss of movement (or control of movement)
- Partial or complete loss of sensation
- Difficulty breathing
- Difficulty swallowing
- Cardiac arrhythmias (uncommon)
- Decreased self esteem
- Relationship problems related to impotence
- Recurrent or unnoticed injury to any part of the body

#### Calling your health care provider [Return to top](#)

Call your health care provider if symptoms of **peripheral neuropathy** are present. In all cases, early diagnosis and treatment increases the possibility that symptoms can be controlled.

Nerve pain, such as that caused by **peripheral neuropathy**, can be difficult to control. If pain is severe, contact a pain specialist to make sure you get the best and most up-to-date pain treatment.

Emergency symptoms include irregular or rapid heartbeats, difficulty breathing, difficulty swallowing, and fainting.

#### Prevention [Return to top](#)

If a prolonged procedure or immobility is expected, appropriate measures (such as padding vulnerable areas) can be taken beforehand to reduce the risk of nerve problems.

Some people have a hereditary predisposition for **neuropathy**. Such people need to be especially careful to limit alcohol and manage other medical problems closely.

All people can reduce the risk of **neuropathy** through a balanced diet, drinking alcohol in moderation, and maintaining good control of diabetes and other medical problems, if present.

#### References [Return to top](#)

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**Update Date:** 8/7/2006

Updated by: Daniel Kantor, M.D., Director of the Comprehensive MS Center, Neuroscience Institute, University of Florida Health Science Center, Jacksonville, FL. Review provided by VeriMed Healthcare Network.

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Links

### Post-herpetic neuralgia in older patients. Incidence and optimal treatment.

**Bowsher D.**

Pain Research Institute, Walton Hospital, Liverpool, England.

Post-herpetic neuralgia (PHN) is a disease caused by having had herpes zoster; it is not a continuation of shingles. Up to 50% of elderly patients who have had shingles may develop PHN. PHN is defined as pain recurring or continuing at the site of shingles, 1 or more months after the onset of the rash. Because many cases resolve spontaneously in the early stages, no claims of 'pharmacological cure' can be entertained before 3 months post-rash. In fact, some authorities will not accept claims made before 6 months. Antivirals administered systemically within the appropriate time-window greatly relieve the pain of acute shingles, and to a large extent prevent scarring. There is no evidence that they prevent the subsequent development of PHN. However, patients with PHN whose acute shingles were treated with aciclovir obtain pain relief with antidepressants in half the time required by those patients who did not receive aciclovir for their acute shingles. If patients with acute shingles are given low dose amitriptyline from the onset, only half as many are in pain at 6 months as a group not so treated, irrespective of the antiviral treatments given. The most effective treatment of established PHN to date consists of adrenergically active antidepressants. There is a strict correlation with the brevity of the interval between acute shingles and initiation of such treatment. 75% of patients starting treatment with antidepressants within 3 to 6 months after shingles obtain pain relief, whereas if antidepressants are not started for 2 years, only 25% obtain pain relief. (ABSTRACT TRUNCATED AT 250 WORDS)

PMID: 7858367 [PubMed - indexed for MEDLINE]

### Related Links

Factors influencing the features of postherpetic neuralgia and outcome when treated with tricyclics. [Pain. 2003]

Post-herpetic neuralgia case study: optimizing pain control. [Eur J Neurol. 2004]

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